IN THE CLAIMS

1. (canceled)
2. (canceled)
3. (canceled)
4. (canceled)
5. (canceled)
6. (canceled)
7. (canceled)
8. (canceled)
9. (canceled)
10. (canceled)
11. (canceled)
12. (canceled)
13. (new) A method for increasing the surface area of a substrate, comprising the steps of:

(a) placing the substrate in an inert atmosphere, having a pressure of between 10^{-3} torr and 10^{-2} torr, into which oxygen has been introduced at a pressure of from one to two orders of magnitude less than said pressure of said inert atmosphere; and

(b) evaporating at least one metal, selected from the group consisting of valve metals only, onto a heated substrate under said oxygen-containing inert atmosphere, whereby the product comprises a mixture of fractal surface structure including at least one valve metal and at least one valve metal oxide deposited on said substrate.

14. (new) The method of claim 13, which is further characterized by at least one of the following features:
(i) said inert atmosphere includes nitrogen;
(ii) said inert atmosphere is anhydrous;
(iii) said product is annealed at about 350°C to about 550°C under a reduced pressure of between 10^{-4} torr and 10^{-5} torr subsequent to step (b);
(iv) said product is subjected to subsequent anodization;
(v) said at least one metal is aluminum.

15. (new) The method of claim 13, wherein said mixture of fractal surface structure comprises at least about 70 wt.% of at least one valve metal and at most about 30 wt.% of at least one valve metal oxide deposited on said substrate.

16. (new) The method of claim 15, which is further characterized by at least one of the following features:
(i) said inert atmosphere includes nitrogen;
(ii) said inert atmosphere is anhydrous;
(iii) said product is annealed at about 350°C to about 550°C under a reduced pressure of between 10^{-4} torr and 10^{-5} torr subsequent to step (b);
(iv) said product is subjected to subsequent anodization;
(v) said at least one metal is aluminum.

17. (new) A method for increasing the surface area of a substrate, comprising the steps of:

(a) placing the substrate in an inert atmosphere, having a pressure of between 10^{-3} torr and 10^{-2} torr, into which oxygen has been introduced at a pressure of from one to two orders of magnitude less than said pressure of said inert atmosphere; and

(b) evaporating at least one metal, selected from the group consisting of valve metals only, onto a substrate heated at a temperature of at least about 300°C under said oxygen-containing inert atmosphere, whereby the product comprises a mixture of fractal surface structure including at least one valve metal and at least one valve metal oxide deposited on said substrate.

18. (new).The method of claim 17, which is further characterized by at least one of the following features:
(i) said inert atmosphere includes nitrogen;
(ii) said inert atmosphere is anhydrous;
(iii) said product is annealed at about 350°C to about 550°C under a reduced pressure of between 10^{-4} torr and 10^{-5} torr subsequent to step (b);
(iv) said product is subjected to subsequent anodization;
(v) said at least one metal is aluminum.

19. (new) The method of claim 17, wherein said mixture of fractal surface structure comprises at least about 70 wt.% of at least one valve metal and at most about 30 wt.% of at least one valve metal oxide deposited on said substrate.

20. (new) The method of claim 19, which is further characterized by at least one of the following features:
(i) said inert atmosphere includes nitrogen;
(ii) said inert atmosphere is anhydrous;
(iii) said product is annealed at about 350°C to about 550°C under a reduced pressure of between 10^{-4} torr and 10^{-5} torr subsequent to step (b);
(iv) said product is subjected to subsequent anodization;
(v) said at least one metal is aluminum.

21.(new) A method for increasing the surface area of a substrate, comprising the steps of:

(a) placing the substrate in an inert atmosphere, having a pressure of between 10^{-3} torr and 10^{-2} torr, into which oxygen has been introduced at a pressure of from one to two orders of magnitude less than said pressure of said inert atmosphere; and

(b) evaporating at least one metal, selected from the group consisting of valve metals only, onto a substrate heated at a temperature of between about 350°C and about 550°C under said oxygen-containing inert atmosphere whereby the product comprises a mixture of fractal surface structure including at least one valve metal and at least one valve metal oxide deposited on said substrate.

22. (new) The method of claim 21, which is further characterized by at least one of the following features:
(i) said inert atmosphere includes nitrogen;
(ii) said inert atmosphere is anhydrous;
(iii) said product is annealed at about 350°C to about 550°C under a reduced pressure of between 10^{-4} torr and 10^{-5} torr subsequent to step (b);
(iv) said product is subjected to subsequent anodization;

(v) said at least one metal is aluminum.

23.(new) The method of claim 21 wherein said mixture of fractal surface structure comprises at least about 70 wt.% of at least one valve metal and at most about 30 wt.% of at least one valve metal oxide deposited on said substrate.

24. (new) The method of claim 23, which is further characterized by at least one of the following features:
(i) said inert atmosphere includes nitrogen;
(ii) said inert atmosphere is anhydrous;
(iii) said product is annealed at about 350°C to about 550°C under a reduced pressure of between 10^{-4} torr and 10^{-5} torr subsequent to step (b);
(iv) said product is subjected to subsequent anodization;
(v) said at least one metal is aluminum.